

## CLAIMS

1. A network node for metro area networking comprising:  
a first wireless interface configured for coupling to a second network node; and  
a link quality management unit coupled to the first wireless interface and having  
a transmission power control unit; and  
a first transmission parameter control unit.
2. The network node of Claim 1, wherein the link quality management unit is configured to adapt a plurality of transmission parameters of a transmission signal of the first wireless interface to in response to variable link conditions.
3. The network node of Claim 1, configured to transfer data using time division multiplexing.
4. The network node of Claim 1, further comprising a TDM user interface configured for data using time-division multiplexing.
5. The network node of Claim 1, wherein the transmission power control unit is configured to control a transmission power level of the first wireless interface.
6. The network node of Claim 5, wherein the transmission power control unit comprises a received power level detector coupled to measure a received power level of an incoming signal received by the first wireless interface.

7. The network node of Claim 6, wherein the received power level of the incoming signal is compared to a threshold value to generate a received power error value.

8. The network node of Claim 7, wherein the received power error value is transmitted to the second network node.

9. The network node of Claim 5, wherein the transmission power control unit comprises an accumulator coupled to receive a received power error value from the second network node.

10. The network node of Claim 9, wherein the transmission power control unit adapts the transmission power of the first wireless node based on the received power error value.

11. The network node of Claim 1, wherein first transmission parameter control unit is a modulation control unit configured to control the modulation rate of the first wireless interface.

12. The network node of Claim 11, wherein the modulation control unit comprises a signal quality detector coupled to measure a signal quality value of an incoming signal from the second network node.

13. The network node of Claim 12, wherein the signal quality detector is a bit error detector.

14. The network node of Claim 12, wherein the signal quality value is a bit error ratio.

15. The network node of Claim 12, wherein the signal quality value is a signal to noise ratio.

16. The network node of Claim 12, wherein the signal quality value is an error vector magnitude.

17. The network node of Claim 12, wherein the signal quality value is transmitted to the second network node.

18. The network node of Claim 11, wherein the modulation control unit is coupled to receive a signal quality value from the second network node.

19. The network node of Claim 18, wherein the modulation control unit adjusts the modulation of the first wireless interface based on the signal quality ratio.

20. The network node of Claim 11, wherein the modulation control unit uses quadrature amplitude modulation.

21. The network node of Claim 20, wherein the modulation control unit uses quadrature phase shift keying.

22. The network node of Claim 1, wherein the first transmission parameter control unit comprises:  
an error correction unit configured to generate error correction code for the first wireless interface; and  
an ECC level control unit coupled to control a level of redundancy in the error correction unit.

23. The network node of Claim 22, wherein the error correction unit comprises:  
a first ECC encoder; and  
a second ECC encoder coupled to the first ECC encoder..

24. The network node of Claim 23, wherein the error correction unit further comprises a convolution interleaver unit coupled between the first ECC encoder and the second ECC encoder.

25. The network node of Claim 24, wherein the first ECC encoder is a Reed-Solomon encoder.

26. The network node of Claim 25, wherein the second ECC encoder is a trellis code encoder.

27. The network node of Claim 1, further comprising a second transmission parameter control unit.

28. A network node for metro area networking using time division multiplexing, the network node comprising:

a first wireless interface configured for coupling to a second network node; and

a link quality management unit coupled to the first wireless interface, wherein the link quality management unit is configured

to increase the bandwidth of the first wireless interface when a signal quality value is greater than a signal quality threshold; and

to decrease the bandwidth of the first wireless interface when the signal link quality value is less than the signal quality threshold.

29. The network node of Claim 28, wherein the link quality management unit is configured to adapt a plurality of transmission parameters of a transmission signal of the first wireless interface to in response to variable link conditions.

30. The network node of Claim 28, further comprising a TDM user interface configured for data using time-division multiplexing.

31. The network node of Claim 28, wherein the link quality management unit comprises a modulation control unit configured to control the modulation rate of the first wireless interface.

32. The network node of Claim 31, wherein the modulation control unit comprises a signal quality detector coupled to measure the signal quality value of an incoming signal from the second network node.

33. The network node of Claim 32, wherein the signal quality detector is a bit error detector.

34. The network node of Claim 32, wherein the signal quality value is a bit error ratio.

35. The network node of Claim 32, wherein the signal quality value is a signal to noise ration.

36. The network node of Claim 32, wherein the signal quality value is an error vector magnitude.

37. The network node of Claim 32, wherein the signal quality value is transmitted to the second network node.

38. The network node of Claim 31, wherein the modulation control unit is coupled to receive the signal quality value from the second network node.

39. The network node of Claim 38, wherein the modulation control unit adjusts the modulation of the first wireless interface based on the signal quality ratio.

40. The network node of Claim 31, wherein the modulation control unit uses quadrature amplitude modulation.

41. The network node of Claim 40, wherein the modulation control unit uses quadrature phase shift keying.

42. The network node of Claim 28, wherein the link quality management unit comprises:

an error correction unit configured to generate error correction code for the first wireless interface; and

an ECC level control unit coupled to control a level of redundancy in the error correction unit.

43. The network node of Claim 42, wherein the error correction unit comprises:

a first ECC encoder; and

a second ECC encoder coupled to the first ECC encoder..

44. The network node of Claim 43, wherein the error correction unit further comprises a convolution interleaver unit coupled between the first ECC encoder and the second ECC encoder.

45. The network node of Claim 44, wherein the first ECC encoder is a Reed-Solomon encoder.

46. The network node of Claim 45, wherein the second ECC encoder is a trellis code encoder.

47. A method of controlling a wireless link between a transmitting network node and a receiving network node, the method comprising:

measuring a first signal quality value at the receiving network node;

measuring a second signal quality value at the receiving network node;

providing the first signal quality value and the second signal quality value to the transmitting network node

adapting a first transmission parameter to improve the signal quality value; and

adapting a transmission power level to improve the second signal quality value.

48. The method of Claim 47, further comprising:

measuring a third signal quality value at the receiving network node; and

adapting a second transmission parameter to improve the third signal quality value.

49. The method of Claim 47, wherein the second signal quality value is a received power level.

50. The method of Claim 49, wherein the measuring a second signal quality value at the receiving network node, further comprises:

comparing the received power level with a threshold value; and

generating a received power error value as the first signal quality value.

51. The method of Claim 47, wherein the first transmission parameter is a modulation level.

52. The method of Claim 51, wherein the adapting a first transmission parameter to improve the signal quality value, further comprises decreasing the modulation level when the signal quality value is less than a desired signal quality value.

53. The method of Claim 52, wherein the adapting a first transmission parameter to improve the signal quality value, further comprises increasing the modulation level when the signal quality value is greater than a desired signal quality value.

54. The method of Claim 47, wherein the first transmission parameter is a level of error correction coding.

55. The method of Claim 47, wherein the signal quality value is a bit error ratio.

56. The method of Claim 47, wherein the signal quality value is a signal to noise ratio.

57. The method of Claim 47, wherein the signal quality value is an error vector magnitude.

58. A system for controlling a wireless link between a transmitting network node and a receiving network node, the method comprising:

means for measuring a first signal quality value at the receiving network node;

means for measuring a second signal quality value at the receiving network node;



means for providing the first signal quality value and the second signal quality value to the transmitting network node

means for adapting a first transmission parameter to improve the signal quality value; and

means for adapting a transmission power level to improve the second signal quality value.

59. The system of Claim 58, further comprising:

means for measuring a third signal quality value at the receiving network node; and

means for adapting a second transmission parameter to improve the third signal quality value.

60. The system of Claim 58, wherein the second signal quality value is a received power level.

61. The system of Claim 60, wherein the means for measuring a second signal quality value at the receiving network node, further comprises:

means for comparing the received power level with a threshold value; and

means for generating a received power error value as the first signal quality value.

62. The system of Claim 58, wherein the first transmission parameter is a modulation level.

63. The system of Claim 62, wherein the means for adapting a first transmission parameter to improve the signal quality value, further comprises means for decreasing the modulation

level when the signal quality value is less than a desired signal quality value.

64. The system of Claim 63, wherein the means for adapting a first transmission parameter to improve the signal quality value, further comprises means for increasing the modulation level when the signal quality value is greater than a desired signal quality value.

65. The system of Claim 58, wherein the first transmission parameter is a level of error correction coding.